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replanted, and the corms themselves buried in the ground and left for the gods. The workers place the corms in their baskets which they carry to the village balanced on their heads (*taku ki luuga o te ulu*).

There is no rotation of talo with other plants nor any system for leaving lands fallow between planting. At the time of greatest famine after the seismic wave, cultivation was alternated between reserve land and private talo beds to ensure that each bed of talo was put to best use and that the corms were allowed to mature properly.

Cultivation further consists in weeding (*lauga'i te vayavaya ai*) and fertilising (*wakalepo* or *akikao*) the talo beds:

The gardens are weeded by women about once each month during the early stages of growth. Weeds are trampled into the soil or allowed to rot on top. When six or seven leaves are fully unfurled, the beds are fertilised with *pukawa* leaves, *loa kotawa* fern, grasses, coconut leaves, or any other vegetable matter. The fern leaves are cut off at the base of the plant and wrapped for transport in coconut-leaf mats (*pulapola*). All the subsidiary branches are cut from the *pukawa* tree, and the leaves stripped by hand from each branch and placed in baskets. The branches are replanted or dried and used as firewood, canoe poles, etc. The vegetable matter is taken to the garden and spread over the ground around each talo plant. Some is trampled in, but the larger vegetable matter is allowed to rot on top. This is mainly women's work, but the men sometimes assist, especially in the cutting down of the *pukawa* branches. Normally there are about two crops of talo from each bed during each twelve-month period. This means fertilising each year about two months after each planting.

In the old days a little dryland talo (*kape*) was cultivated. Killed by the tidal wave, it has not been replanted.

At least eighteen stages in the growth of talo or *pulaka* are recognised:

Tuki te tiagapula: the cutting is planted.
Fo loa, loa tupu ai ala o te wawa: 1st day, the roots grow.
Fo tolu, loa velo te lito: 3d day, the young leaves begin to protrude from the base of the innermost petiole.
Fo lima, loa lua te lito o te loa: 5th day, the young leaves grow tall.
Fo angauulu, loa velo te lito woa: 10th day, new petioles and leaves shoot up.
Taeyno itu, loa loa lua: the next day, there are two petioles and leaves.
Koa velo mai te tolu o te lito: (15th day) the third petiole and leaf start up.
Koa loa tolu: (20th day) there are now three petioles well grown.
Koa loa wa: (22d day) there are four petioles. This is the time to cultivate and fertilise the young talo.
Koa loa lima: (25d day) there are five petioles growing.
Koa wakaloangavali: (29th day) the leaves sway freely in the wind.
Koa tookii te loa loua, loa uyi, loa tupu mai ohi te loa lima, loa ono loa talo, loa ala: (30th day) petioles spread and darken in color, the leaf grows large, there are six main leaves, the plant flourishes.
Koa akauto ki luuga: (35th day) the petioles grow high.
Koa ala loa ki luuga: (45th day) the petioles grow high indeed.
Koa tuku te tio: (2d month) the head is left, the petioles and leaves stop growing, and the corm begins to grow.
Koa matuya te wawa: (3d month) the corm is two finger-joints long.
Oko ki te vavauga o te wawa: (4th and 5th months) the time when the corm grows rapidly.
Koa kivi, loa wawalo: (6th and 7th months) the corm is mature and large.

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The operator procures a piece of *puapua* wood from which the bark has been removed. This wood is about 4 feet long and 1 inch in diameter and has numerous grooves on it from previous use. The operator splits the end of the stick and cuts off a section to use as a rubbing stick 9 inches long, ¼ inch thick at the proximal end (*walimoli*), and about ⅜ inch thick at the distal end (*mata*). The distal end is shaped to a mesial point by a transverse cut with a knife. A few slices of wood are also taken off the hearth stick to form a flat surface to rub on. The point of a knife, formerly a sharp-pointed shell, is pressed into the distal end of this flat surface to form a hole which serves as a blockage point for the farthest distal movement of the rubbing stick. An assistant crouching over the stick firmly holds the distal end of the hearth stick (*yoliyoli te lakau*) with foot and hand. The operator sits on the floor and locks one leg over the hearth. He holds the rubbing stick so that the crossed thumbs are placed beneath the stick; the flexed fingers of the right hand are placed over the stick and on them are laid the flexed fingers of the other hand. The grip is close to the distal end of the stick, 3½ inches from the point. He crouches over the stick, leaning the whole weight of his body on it while moving the stick to and fro at an angle of 45 degrees to the hearth. The groove is about 3 inches long. The operator rubs slowly at first, increasing the speed of the rubbing as the dust collects and begins to smoke. When the dust smoulders he cries, "Na tu" (It burns). The smouldering dust is carefully tipped onto a dry coconut husk and fanned or blown until the husk blazes. Some fire-makers prefer a very short rubbing stick and hold it close to the end so as to exert maximum pressure on the stick. An informant, holding his stick 3½ inches from the point, produced fire only on a second attempt.

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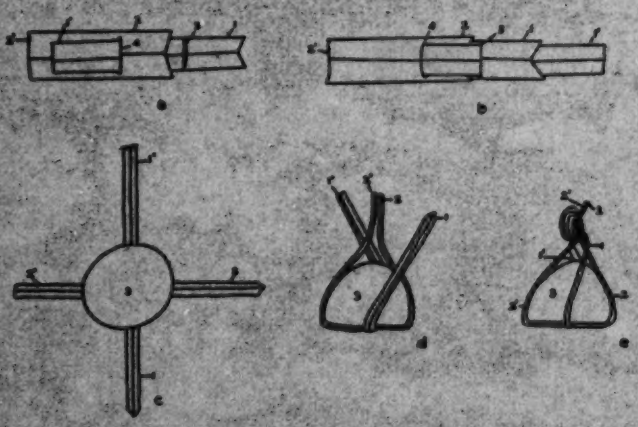

FIGURE 6.—Food packages: *a-b*, *lafa* food package; *c-e*, talo (*loloi*) food package. *a*, leaflet midribs stripped from butt ends of two coconut leaflets (1, 1′ and 2, 2′), slits (3, 4) made with thumb nail in butt ends of the leaflets, tip end of leaflet (1′) passed through slit (4) in leaflet (2); *b*, tip end of leaflet (1′) folded back, passed through slit (3) in butt end of leaflet (1) and pulled tight, length of joined leaflet placed under food package, two ends make transverse turns around package and tie with overhand knots. *c*, two coconut leaflets (1, 1′ and 2, 2′) crossed and food package (3) placed on crossing; *d*, leaflet ends (2, 2′) brought together and held with one hand; *e*, leaflet ends (1, 1′) twisted around ends (2, 2′); then ends (2, 2′) bent down over transverse turns, pushed up under transverse ends, and pulled tight.

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and kept on rough platforms made by laying longitudinal members across the tiebeams of the house. Plaited pandanus satchels (*tuluma*, p. 134) for valued fishhooks and larger satchels of the same type for malos and other items of dress were also kept on the tiebeam platforms.

Plaited pandanus pillows (*ulunga loubuma*, p. 134) and wooden headrests (*ulunga lakau*; fig.12,*d*) were in occasional use. Most people, however, did not go to the trouble of making a special pillow but used for this purpose any suitable block of wood. Soft driftwood was favorite material, a piece of cork of suitable size and thickness being most prized. Today, the usual headrest is a block of wood inserted into a European pillowcase and packed tight with a thin layer of kapok. This pillow combines a desired hardness with the prestige value of using a European object.

Wooden back rests (*taka*; fig 12, *c*) were occasionally made in former times. Made of *makaseve* wood, they were used for resting in a reclining position inside or outside the house.

Insect switches (*uvuu*) are in great demand when mosquitoes (*uvuu*) become vicious:

These switches are quickly made by superimposing three sections from the tip end of coconut leaf midribs, each section carrying 10 to 20 leaflets. These are bound together by several transverse turns of fiber from the coconut leaf midrib or by passing two leaflets from the bottom midrib around the several midribs in opposite directions and tying the ends together with overhand knots. The switch is discarded when the leaflets become dry.

Brooms (*velevele*) made from leaflet midribs are in common use to sweep up rubbish from the floor of dwelling or cook houses.

A short broom (*velevele tuasie*, Ch193) is made of midribs (*iuu*) stripped from coconut leaflets and dried in the sun. These are caught about 1 inch from the proximal end in a three-ply braid of pandanus material (*lito*) about ½ inch wide. The projecting midrib ends are bent over and braided with one of the *lito* plies as a single ply. The braiding is continued for about 25 inches; for this length, about 170 midribs are required. When all the midribs have been added, the braiding is continued for about 6 inches and fastened with an overhand knot (*vakapona*). Starting with the commencement end, the braiding is rolled (*tupetupe*) on itself to form a convenient bundle of midribs. The free end of the braid is wound around the butt ends (*mulimuli*) of the midribs and fastened with an overhand knot. The distal ends of the midribs are trimmed off to make bristles about 2 feet long.

A large broom (*velevele mole*) for sweeping the ground outside the houses is made from hard coconut midribs that have dried on the leaflets. The midribs are gathered together in the hand and spaced evenly around the end of a long handle, generally a length of *ngangie* wood about 4 feet long. The butt ends of the midribs are fastened to the handle with transverse turns of *tanale*, commencement and finishing ends being buried underneath the turns.

Lighting inside the dwelling house is usually provided by burning a few dry coconut shells on the floor. Today kerosene lanterns are fairly common,

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fiber joining end pairs resting in these nicks. The carrying pole is discarded when the worker returns to the village. Shaped, permanent carrying poles are never used.

A spatula-shaped implement (*kalokalo taumaya*, C8037) of *ngangie* wood is used to scrape out the soft flesh of the drinking nut. One end has a sharp point used for opening the nut by piercing the soft eye. The other end is broad and is used for scraping out the flesh after the liquid has been drunk. The implement is a combination of scraper and spoon.

A hand grater (*kalokalo ni mata*, C8091) is used for grating the flesh of the coconut to make the coconut food called *nia kalokalo*. The blade is the *nyoloto* section of a pearl shell. The nacreous inner surface of the shell forms the front surface (*alealo*) of the blade, the black outer surface forms the back (*tua*) of the blade. The teeth of the serrated edge of the blade are termed *mata*. The blade is fixed to the handle of *ngangie* wood by 17 transverse turns of three-ply sennit, with buried commencement and finishing ends.

A stand grater (*tuai*) is used to grate the flesh of the mature coconut to make coconut cream. No shell graters (fig.12,*b*) are in use on the atoll today, but the stand-grater principle is retained in the use of a toothed metal grater attached to a wooden arm which is fastened to a box. To use the shell grater, the worker sat on the horizontal base. Holding the half coconut with both hands, she worked the flesh against the grater teeth with a downward rotary movement. The gratings fell onto a coconut mat on which the grater rested.

A coconut cream wringer (*tawanga*) is made from the husks of the coconut at the *nia mata* stage after burial in beach sand to macerate the interfibrous material. The husks are beaten with a stick to remove the decayed parts, washed in water, and are ready for use when dry.

Food packages for transporting talo pudding or fish are made by placing the food on the platter called *loulou nea loloi* and then folding back the two tails (*nuhopona*) of its finishing edge over the food; the tails are pushed through the plaiting just below the midrib commencement edge, their free ends tied in a reef knot to make a compact package.

Water containers (*nuwongi*; fig.13,*a*) are made from especially large coconut shells. The husk is removed and the shell opened at the soft eye. The liquid is poured off and the shell filled with salt water. When the flesh has rotted, it is removed through the soft hole with a special scraper called *vulayi* or *valu nuwongi* (fig.12,*e*). A handle of sennit is tied to the netting on either side and the containers hung in pairs (*nuwai*) to the rafters of the cook house. No containers were seen in use, their place being taken by buckets or empty cans.

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244 412 Various implements are used in the harvesting and preparation of taló. The worker in the taló gardens formerly sliced the petioles from the corms with a cutting implement (*taku*, C8096, C8097) made from the backbone of the turtle. This knife was also in general use as a cutting implement as was a knife (*pale*, C8145) made of the jawbone and attached teeth of the *pale* fish (*kauvae pale*). No spade was used for replanting taló; if the ground was hard it was first loosened with a short, straight digging stick (*koyo*).

252 F12 Taló is prepared for cooking by scraping the dirt from the corm. A scraping peg (*tukituki tete uuma*, C8083) is made from a section of coconut midrib (*palelauu*) about 17 inches long. The proximal end of the peg is rested on the ground and the distal end placed against a half coconut shell or piece of wood of suitable height 6 inches from the distal point. The worker holds the proximal end of the peg tight by resting her left knee on it. She holds the corm with the left hand at the distal point of the peg and scrapes (*tete*) the corm downward and toward the body with a scraper (*hai*). The *hai* (C8084) is the bottom portion of a small, discarded dry coconut shell. Part of the outer edge circumference is cut away to form a short cutting edge.

After the scraping, the taló may be sliced (*tala*) into sections with the *hai* scraper, cooked whole, or grated on a stone grater (*matu ola uuma*). A typical grater (C8053) is a block of coral (*punga talatala*) with a rough surface. The block weighs 8 pounds, is 15½ inches long, averages 6½ inches wide, and is 3 inches thick. The worker sits before the stone and rubs the corms under pressure up and down the surface of the stone.

An oven spreader used for spreading (*tolo*) the hot stones of the oven is a section of the butt end of a coconut midrib (*palelauu*). Oven tongs (*pingoi* or *mangoi*, C8191) are made of a piece of coconut midrib, 18 inches or more long. The leaflets are trimmed from the side edges and the midrib doubled so that the outer fibers snap while the inner ones remain to form a sort of hinge. The tongs are green when first made but dry quickly and become brown. Tongs are in constant use for shifting the hot stones of the native oven.

252 412 415 Cooked taló is pounded and mixed with coconut cream in a wooden bowl (*kumete*). A small bowl is shown in figure 13,*a*. A common type pounder (*tuki*) of *ngangie* wood is shown in figure 13,*b*. Pounders in use become polished with oil. Those seen in use ranged from 1 foot 5 inches to 1 foot 7 inches long, with 3¼ inches diameter of pounding base. A cone-shaped proximal end is common, but a few pounders have a terminal knob. A larger wooden stirrer (*yau*) also of *ngangie*, is shown in figure 13,*c*. Other bowls in use were examined in the field. They may be briefly described as

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show variations on the type elliptical bowl. All bowls were carved from a solid block of wood. Large bowls used to prepare the talo foods for feasts are named after their makers.

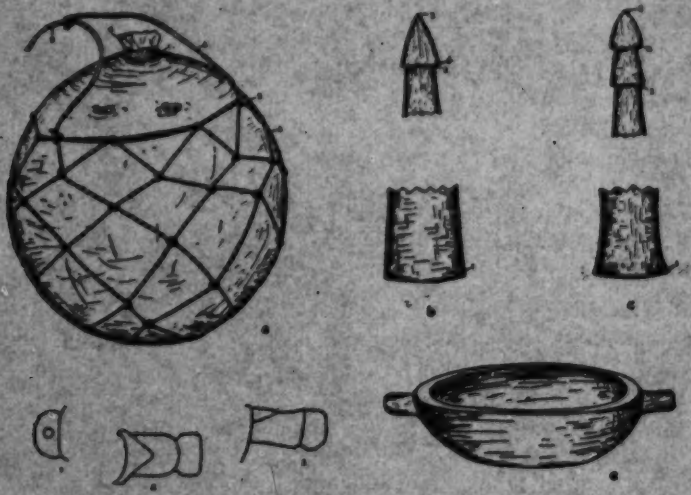

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FIGURE 13.—Household equipment. *a*, coconut water container (*nuvungi*) (Cb952): soft eye (1) of large coconut (2) opened and enlarged; net (3) of two-ply twisted sennit cord encloses shell; handle (4) made by knotting three-ply braided cord to top of netting on either side and knotting another cord (5) to first one; 6, cork (*nanono*) a strip of dry pandanus leaf rolled into cone shape and stuffed with more pandanus leaves. *b*, talo pounder (*tuki*) of *ngangie* wood (Cb950): weight 4 pounds, length 1 foot 10 inches, diameter of base (1) 3¼ inches, diameter of neck (2) 1¾ inches; distance from point of proximal end (3) to neck, 2¾ inches; diameter of base (4) of cone-shaped proximal end 1⅜ inches; pounding base (1) flares slightly and is slightly convex; surface of pounder smooth. *c*, talo mixer (*ywe*) of *ngangie* wood (Cb951): weight 3¾ pounds, length 2 feet 4 inches, diameter of base (1) 3 inches, diameter of neck (2) 1 inch; length of first cone of proximal end from point (3) to base (4), 1⅝ inches; length from base of first cone (4) to base (2) of second truncated cone 1⅜ inches; distal end of mixer flares out and pounding surface is slightly convex. *d*, variant lugs of wooden bowls: 1, top view of left lug, 2 inches broad, 1 inch wide, and 1⅜ inches deep at bowl rim; hole, ⅜ inch in diameter, runs through lug, by which bowl is suspended; 2, 3, top and side views of right lug of same bowl; lug, 1⅜ inches wide and 1⅜ inches thick, carved in conventional phallic symbol 3 inches long. *e*, small food bowl (*kumete*) of *pupua* wood (Cb139): greatest diameter 14⅜ inches, least diameter 13 inches; thickness of sides at rim ranges from ¾ inch to 1 inch; depth of bowl 4⅛ inches; lugs plain, 2 inches long and 1 inch in diameter; bottom flat.

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Bowl Name	Longest Diameter	Shortest Diameter	Depth	Remarks
—(1)	20"	15¼"	7"	No lugs.
—(2)	17"	11"	4"	Right lug plain, bored with hole to facilitate hanging. Left lug conventional phallic symbol. (See fig. 13*d*).
Pilato	6' 7"	4'	13¼"	Each lug 9" long and carved into realistic phallus. Bowl holds 1000 talo corms. Two food mixers accompanying this bowl are of ngangie wood, each 23½" long and 2½" diameter at pounding base.
Palaoniuea	4' 8"	1' 6"	12"	Lugs plain, 11½" long and 3" diameter in cross section. Bottom shaped like a turtle back (tua woma) and propped with stones when in use. Holds 400 corms.
Kila	6' 4"	1' 5"	10½"	Lugs plain, 11" long, 4" by 2" in cross section. Turtle-backed. Holds 1000 corms.

Large coconut shells in which to cook talo are set aside whenever they are available. The cook always tells a person about to open a large coconut to crack it with care and put aside the shell when he has drunk the liquid and scooped out the flesh. Shells are thrown away after being used once as cooking utensils.

PLAITING

Plaited articles of coconut leaf or pandanus material are still in common use in Pukapuka. Among these articles are plaited roof sheets and wall screens, floor and sleeping mats, and articles used for transporting, storing, and serving foods. Formerly plaited articles were used also for everyday and ceremonial dress.

In the following brief description of Pukapukan plaited articles, the terminology used is that established by Buck (27, pp. 164-168).

Pandanus Material

Pandanus trees are not cultivated to provide material for mat making. Plaiting material prepared from the leaves (*lau*) of the *wala* variety is termed *lito*, and from the *yulu* variety, *lowalu*.

The method of preparing *lito* material is as follows:

A woman collects green pandanus leaves from trees in the reserves and brings them back to the village. While the fire she has made of dry coconut midribs and butts is burning, she takes each leaf and slices off (today with a knife, formerly with a sharp

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SATCHELS, BELTS, PILLOWS

Satchels of pandanus are used today in Pukapuka to carry to church on Sunday a Bible and note paper with which the sermon is followed and text noted down. The making of these satchels has been introduced from the lower Cook Islands, and the craft conforms in all particulars to satchel techniques described for Manihiki and Aitutaki (29, pp. 127-131; 26, pp. 190-202). Coiled baskets are sometimes made, but the technique has been recently introduced from Samoa by the wife of the resident agent.

A two-cornered pandanus double, or envelope, satchel called *tuluma* is thought by informants to be old. Small *tuluma* such as the one described below were used for storing fishhooks and pearl-shell ornaments. They were known as *pa tuluma*, and a specially valuable pearl-shell hook was known as *mali tuluma*, (the precious object) after the bottom of the *tuluma* receptacle. Larger *tuluma* were made for the storage of pandanus and sennit makes. The *pa tuluma* (C8120) is made of *lauuulu pukapuka* and *lito* materials:

> The inner satchel is 9¼ inches long, 7½ inches deep and 1 inch wide. The outer satchel is 9⅝ inches long, 6¾ inches deep and 1⅝ inches wide. The plaiting is coarse, wefts being 3 to the inch. The plaiting is in check, with double elements, alternate sets of elements being dried pandanus and *lito*. The basket is plaited like a strip of mat, the ends brought together and the free marginal wefts plaited to make a cuff plaited in sections to the required depth. The sides are brought together to compress the bottom opening longitudinally; the bottom is closed by check plaiting. The free ends of the finishing wefts are pushed (*pulo*) under three or more elements in the plaiting on the outside of the satchel, pulled tight, and the exposed ends cut off flush with crossing elements. The rim is finished with a level edge by the downward turn of the rim elements.

Abdominal belt supports worn by women after confinement are made of plaited pandanus:

> Belt C8072 (*pale nunuou*) is 1 foot 11 inches long, 4 inches wide. Strings by which the belt is fastened at the back range from 8⅝ to 10⅝ inches long. Wefts 6 to the inch. Plaiting is by the simple mat technique in double element check, with *lauuulu pukapuka* and *lito* used as crossing elements to form a small diamond-shaped design. When the belt length is finished, material for the strings is pushed through under seven to nine crossing elements at each corner. Four strings are thus attached to each corner and braided into a four-ply braid, finished off with a single overhand knot.
>
> Belt C8073 (*pale tatu*) is 2 feet long, 3 inches wide. Strings range from 8 to 13½ inches long. Wefts 4 to the inch. Plaiting is with double element check of *lauuulu pukapuka* and *lito*, forming a simple diamond design. Three string elements are pushed under crossing elements at each corner and braided into a three-ply braid, finished with a single overhand knot. Both belts are shorter than they would be if intended for use by Pukapukan women.

Informant stated that formerly a pillow or headrest (*ulu-fo loukoua*) was made from plaited pandanus material. As described, the pillow was apparently cylindrical in shape, 12 inches long and 6 inches in diameter at

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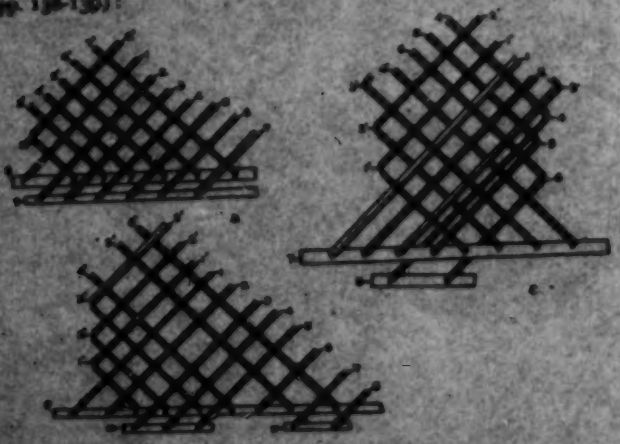
285 115 Baskets made with the Pukapukan turned-back, two-strip commencement (fig. 15*a,b,c*) are called generically *kete*. They are used for transporting taro corms, coconuts, crabs, and the like. Small baskets with one or two points are sometimes used to hold taro pudding (*ofo*), but they are generally used as shellfish and crabbing baskets. The plaiting technique is the same as for the Manihiki *pito* pointed receptacles (29, p. 117, fig. 33).

617 Pukapukan baskets in Bernice P. Bishop Museum are described in the list (pp. 138-139):



165 FIGURE 15.—Commencement. *a*, turned-back two-strip commencement: middle strip (8) with leaflets naturally directed toward right; leaving out first leaflet (1), remaining leaflets on strip turn back to function as sinistrals (2', 3', 4', 5', 6', 7'); sinistrals engage with naturally inclined leaflets of second strip (9) which function as natural dextrals (2, 3, 4, 5, 6, 7). *b*, discontinuous two-strip commencement: lower continuous leaflet strip (9) carries leaflets naturally directed toward right; leaving out dextral leaflet 1 and 2, leaflets 1', 2', 3', 4' are turned back to function as sinistrals, engaging with naturally inclined dextral leaflets (3, 4, 5) carried by second strip (10); leaflet 6 of first strip (9) keeps its natural direction and acts as a dextral; the next two leaflets of this strip (5', 6') bend back to act as sinistrals engaging previous dextrals; leaflets (7, 8) of third strip (11) act as natural dextrals and will engage with turned-back sinistrals of first strip; course of plaiting continued by additional strips and turning back of naturally inclined leaflets to left to act as sinistrals. *c*, variation of turned-back two-strip commencement: middle strip (7) carries eight leaflets naturally inclined to right; to establish stroke four leaflets (1, 2, 3, 5) function as natural dextrals; they engage in plaiting stroke remaining four leaflets on strip which are bent back to act as sinistrals (1', 2', 3', 4'); additional strip (8), carrying two natural dextrals (4, 6), placed under first strip (7), and two extra dextrals engage with turned-back sinistrals of first, or upper strip (7); when stroke has been established, edges are formed by giving a half turn to sinistrals at left edge so that free sinistrals are converted back into functioning dextrals; for right edge, free dextrals given a half turn to left and continue to function as sinistrals in plaiting.

Name	Number	Size	Plaiting Technique			Use
			Commencement	Body of Basket	Finishing	
Kete ava ika	Ch202 (2 specimens)	12" long, 14" deep, 4" wide; 10" long, 12" deep, 3" wide	turned-back, two-strip	check	single-tail braid, free end knotted close to right side bottom on outside	used for carrying coconuts
Kete ava tuna	Ch154	12" long, 14" deep, 3" wide	turned-back, two-strip	check	single-tail	used for carrying crabs or coconuts
Angopiko matitai (printed, triangular)	Ch199	12" deep, 10" rim diameter	plaiting technique same as for Manihiki pito patanui rokopanoko (29, p. 119, fig. 33)	all sinistrals braided together and knotted; same for dextrals	shell fishing and crabbing basket; occasionally used for tale pudding (ako)	
Angopiko matitai	Ch186	10" deep, 6" rim diameter	similar to Ch199	same as Ch199	same as Ch199	
Angopiko matitai (two points)	Ch198	9½" deep, 6" rim diameter	same as Ch199; open leaf check corners made by turning normal lean of sinistrals to right so when basket is turned over to plait opposite side, sinistrals function as dextrals and dextrals as sinistrals	ends braided, passed over and around commencement strip, knotted above strip so that tail is made fast to prevent basket falling open when full	used for shellfish	
Angopiko matitai	Ch189	5" deep, 5" rim diameter	single strip of leaflets with each leaflet split longitudinally, left half turned back as sinistral, right half acts as dextral; other split leaflets added to make close plaiting	check	all sinistrals braided into short tail and knotted; dextrals braided and knotted over end of commencement strip	used for shellfish
Angopiko wai kave (basket made with a handle)	Ch196	5" long, 5" deep	4 strips of midrib each carrying 2 leaflets; open leaf check similar to oblong basket of Aitutaki (26, p. 168) and to oval basket of Tahiti (16, p. 20, fig. 6), whence it may have been introduced		2 dextrals and 2 sinistrals on each side braided into four-ply braid. Knot of one passed through braid of other tail, thus forming handle	used only by children as a fishing basket for yellow mullet (kuloma)

Name	Number	Size	Plaiting Technique: Commencement	Plaiting Technique: Body or Basket	Plaiting Technique: Finishing	Use
Oka wuli fau	Ch109	width, bottom 4½", top 3½"; depth, 7½"	twisted two-strip	twill with few rows of check at bottom	two-course braid, free tails tucked under crossing elements inside	child's fishing basket
Oka wuliwuli	Ch177	width, bottom 6½", top 8"; depth, 5½"	twisted two-strip	twilled two's with no extra commencement leaflets	concealed double tail, free tail tucked under crossing wefts inside	child's basket used in groping for fish
Oka fua	Ch148	width, bottom 10", top 15"; depth, 15"	twisted two-strip	began with 3 rows of twilled four's and two's followed by 4 rows of twilled two's, then alternate dextrals and sinistrals brought together and plaited as single elements in 5 rows of check	two-tail finish (28, p. 133,fig.18), free ends tucked under crossing wefts on inside	fisherman's basket used for bait or fish-line
Oka matuku	Ch105	width, bottom 18", top 30"; depth, 15"	twisted two-strip	twilled two's	two-tail finish, free ends pushed through to inside then to outside	used to hold flying-fish catch
Oka wuli ua	Ch160	58" long; 21" wide at greatest diameter	twisted two-strip	4 rows twill, 6 rows check, 4 rows twill, 3 rows check, 2 rows twill. Top shaped by plaiting 2 elements as single element in 13 rows of check	two-braid, ends knotted together on outside to form rough handle	used to block mouths of fish weirs
Kete ava wawa	Ch151	18" long, 12" deep, 6" wide at top	discontinuous strip, lower strip containing 23 leaflets, engaging with 7 discontinuous strips of 2 or 3 leaflets each (fig. 15,b)	check	two-braided tail, free end tucked under crossing wefts at one side	used for bobbing bait

2R5 #16

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

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A small receptacle or container of coconut leaf is sometimes made to transport young birds from the reserve islets to Wale. The containers function also as bird cages.

Receptacle Cl144 (*pupu moma*) is made from a length of coconut midrib, 14 inches long and carrying 19 leaflets, cut from the tip end of a coconut leaf. The plaiter works with the midrib base uppermost, and starting from either end plaits the leaflets in a close check to form a cone 10 inches long, base diameter 4 inches (fig. 16). The base is finished with a three-ply braid, and the two free ends of the braid are knotted together. When a bird is placed inside the cone, the base is fastened together by interlacing a leaflet from side to side through and under the base braiding. If the receptacle is used to transport flowers or plants from the islets, the cone-shaped container is plaited round the objects.

FIGURE 16.—Commencement of cone-shaped receptacle (*pupu moma*). *a*, section of midrib (1), carrying nine leaflets (2, 3, 4, 5, 6, 7, 8, 9, 10): broad base of midrib uppermost. *b*, commencement of plaiting: leaflet 8′ carries across from left to right and engages leaflets 2, 3, carried across to left; leaflet 3′ carries to right and engages leaflets 8, 2, 4; process continues, alternately bending left side leaflets to right, right side leaflets to left, plaiting leaflets in check. *c*, result after several plaiting strokes: leaflet 5′ has engaged leaflets 2, 3, 4, 5, 6 and has passed around under cone; similarly, leaflet 2 has engaged leaflets 8′, 3′, 4′, 5′ and passed to other side of cone; other leaflets, those from left side functioning as dextrals, those from right side as sinistrals, plaited together in open leaf check; only six leaflets on each side figured, but process continued with all leaflets on midrib base; when cone is large enough, free ends of leaflets braided in three-ply braid, and two ends of braid knotted together, forming fixation edge for mouth of receptacle.

Platters (*laulau*) on which food is served are characterised by a natural concavity formed by the dull side of the coconut leaflets when plaited or folded together. All pudding platters for the talo dish called *olo* have the braided finishing edge; all fish platters have the overhand knot finish; all platters for the talo dish called *lolei* have the non-braided, double-knot finish. All platters are approximately 18 inches wide and 9 to 12 inches deep.

Platter Cl681, *laulau ote olo*, is used for serving the talo pudding (*olo*). The platter has the Pukapukan sword-knot, two-strip commencement. It is plaited in open

285 leaf cloth for 6 rows. The dextrals are gathered together and braided in three-ply,
275 and finished with a knot; the sinistrals are similarly treated.

Platter Cloths (*koukou ana ika*) is a platter for serving fish. It has a single-strip commencement in which four leaflets from the left function as dextrals and four leaflets on the right are turned back to function as sinistrals. Two leaflets carried on one strip are added to make the plaiting closer. The plait is in check for a depth of 12 inches when dextrals and sinistrals are gathered together on one side and tied in a double overhand knot with the gathered welts from the other side.

Platter Cloths (*koukou ana loloi*) is a platter for serving the dish called *loloi*. It has the turned-back, two-strip commencement, and the body of the platter is plaited in open leaf check for a depth of 12 inches. In finishing the edge, all the dextrals are carried across to the right side and knotted. Similarly, the sinistrals are all carried across to the left side and knotted.

MALO

291 Formerly the everyday dress of the Pukapukan man was the coconut-
285 leaf malo (*malo kouvie*), made by ordinary plaiting technique. It was worn during working hours and thrown away when soiled. The following malo is typical:

Malo Ohoka (*malo kouvie*) is made from a strip of midrib 13½ inches long, carrying 10 leaflets (pl. 3,*B*). Each of the six leaflets in the middle of the strip is split into four lengths longitudinally. These 24 elements are plaited in a close check to a depth of 10½ inches, width 7 inches. What is really a small coconut sheet is narrowed by plaiting two elements as one for five rows and then four elements as one for one row, the ends being gathered together and braided in a four-ply tail of which each ply is composed of four elements. The tail is 19½ inches long and finished with an overhand knot. The sheet material has a natural concavity on the dull side of the leaflets. The two end leaflets on either end of the commencement strip are each split into two longitudinally and braided in a four-ply tail, finished with an overhand knot, 24 inches long on one side, 20 inches long on the other. The commencement strip is chewed with the teeth and softened before wearing.

FANS

285 Both coconut leaf and pandanus fans (*ili*) are made by the women and
293 used on all occasions by men and women. (See pl. 3, *A*.) A square fan made of pandanus is similar to a type of Samoan fan figured by Buck (27, p. 633, and pl. LV, *B*, 4), but the style is said to be old in Pukapuka:

This fan (Ohyo), *Ili kouvie kaweai ma te lita*, is plaited in check with welts of *lito* and *kouvie pukapuka* (pl. 3,*A*,1). It is 7 inches square and mounted on a handle of *pupisa* wood 14 inches long and ¾ inch wide. The commencement of the plaiting is by the ordinary pandanus mat technique. The left edge and the bottom edge are plaited to a depth corresponding to half the size of the completed fan. At the working edge a shed is made the width of the fan. A long strip of *lito* material, the width of the handle, is laid in this shed, passing underneath and back over the last element of the shed. The handle, which has been whittled down to half its thickness, is laid in the shed on top of the *lito*. The strip of *lito* is brought back and laid on top of the handle, the free ends of the *lito* strip projecting beyond the proximal end of the handle. Plaiting continues beyond the handle which is then gripped by the crossing welts, as alternate elements forming the shed are laid down and taken up. The fan is then turned so that the pandanus left edge is at the bottom of the plaiting and the handle projects to the left.

1:Bengtchole 6nd Bengtchole E-8 (1934-5)1938 Pukapukans

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An extra sail support is needed with the gaff sail (fig. 30). This spar is termed *tolo*. At the lower end it rests in a socket (*tokonanoga no te tolo*) fastened to the mast. In a strong wind blowing directly aft, the gaff sail is supported by a further stay that runs from the head of the spar to the stern cross lifting bar, considerably to the curve of the stern piece around which it is fastened.

For a one-man canoe for sailing to the islets, a rough-and-ready sail is made from a coconut-leaf mat (*tokepau*). A pole is snapped in the canoe and lashed to the forward cross beam. The middle side of the mat is fastened to the pole with sheets of coconut fiber (*kaiuru*) and the outer edges of the mat stayed by guys passing to the hand of the sailor who sits in the stern of the canoe and steers. A *tokepau* mat makes ample wind to speed along a small canoe.

The mast of any Pukapukan canoe is mounted at either end of the canoe, the outrigger being invariably kept to windward. The canoe can not tack without unshipping the mast and putting it up at the other end of the canoe. Sailing fast (*kaloli or pale*) in a heavy wind, some members of the crew rest their weight on the outrigger cross beams in order to counterbalance any tendency of the outrigger to lift out of the water. Under sail a Pukapukan canoe lies close to the wind, but tends to make rapid leeway for want of a keel.

Paddle and Bailer

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The Pukapukan paddle (*vaoe*, fig. 26*d*) has a projecting knob (*vaoe*) at the distal end of the blade. This knob has a dual function. It protects the blade (*laulau vaoe*) when the canoe is being paled over lagoon shallows, and, when the paddle is brought from the water with a sharp wrench after a short jab stroke, the knob makes, in contact with the water, a short, sharp, ringing sound (*kua tangi te vaoe*), used to attract fish to the fishing canoes. It is a very characteristic sound in Pukapukan paddling, and wherever it is necessary to imitate a canoe in May Day play festivals, a file of men with sheet making this sound with their lips, as the canoe rises and lowers their arms.

The paddle is used on both port and starboard sides of the canoe. The outrigger does not offer great impediment to the typical short, jabbing strokes of the Pukapukan paddler. Any paddle is used indifferently for steering and paddling. Formerly, the paddle was always held with the knob (*kua*) turned toward the rear of the canoe. This usage (*ala kua*) is reserved today for short sprints and for making the paddle resound, the front (*alaala or vakevake*) of the paddle being now commonly directed toward the rear.

Each canoe has as part of its equipment a long pole (*tolo*) used for poling the canoe over reef shallows. Some canoes returning to Wale from Motu Ko keep the reef circuit and make good speed with two people poling, one in the bow and one in the stern.

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The bailer (*tata*, fig. 26*g*) is of common Polynesian type. It is not decorated with carving. In use, the bailer is not filled, lifted, and emptied over the side of the canoe, but water is gathered from the bottom of the hull and shot out with one vigorous and continuous scoop. In small canoes, an empty coconut shell serves as a bailer.

Measurements

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The principal measurements of seven Pukapukan canoes are given in Table 3. These measurements may be compared with those of the 13-meter canoe shown in figure 25.

The support by which the forward end of the outrigger float is set to starboard to give the steering qualities of the canoe ranges in the canoes measured from 2 to 6 inches, with an average of about 3½ inches. Pukapukan canoe builders gave no rule

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 254 in three transverse turns round the strand (fig. 33*b*). Five spreader sticks 9 inches apart are attached to the strand in this way, being lashed so that the distal ends of the sticks project alternately to the left and to the right of the strand. The distal end of each spreader stick is also grooved circumferentially, and a length of twisted sinnet, 1½ inches long, is doubled and the free ends fastened to the spreader stick groove by transverse turns of fine sinnet. To this double spreader stick strand, the fishhook strand proper is fastened by the method of lowering illustrated in figure 33*b*. Five fishhooks are attached to the five spreader sticks. By making these sticks project alternately to left and to right, the danger of tangling the hooks in use is avoided.

Informants mentioned another type of *tauanukanuka* formerly in use. It consisted of two crossed spreader sticks of *upangia* wood, each stick about 18 inches long, with a cross section diameter of about 1½ inches. To the ends of each spreader a strand was joined. The four strands ranged in length from 2½ to 6 feet so that four fish caught on wooden hooks knotted to each strand would not tangle the strand lines. At the intersection of the spreaders, a sinker line (*kauanua tuku moove*), 12 inches long, was fastened to support the sinker (*moove*) of *pungo* coral. Also at the intersection of the spreaders was knotted a secondary strand (*moeai*) 42 feet long. To the *moeai* was fastened *pauaki* fishlips about ten fathoms long.

Sinkers

For fishing at moderate depths of 50 or 75 fathoms, sinkers (*moove*) consist of any coral stones of suitable weight picked up on the beach. Because these sinkers are disengaged from the line and fall to the bottom when the hook has reached the required depth it is pointless to use any but rough stones. In *tukimoana* fishing, one sinker weighing about 9 pounds is used repeatedly. Even for this the Pukapukan fisherman has apparently felt no incentive to make well-shaped or bored sinkers. He chooses as a sinker stone a block of coral that is roughly rectangular or cone-shaped. If the surface is not rough enough to hold the sinker line without slipping, it is chipped slightly to form two transverse grooves into which the sinker line fits. This line is attached to the sinker by transverse turns and knotted to the secondary strand (see figure 33*c*).

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Fish Clubs

227 Fish clubs (*pato ika*) are made of *upangia* wood; their size and weight depend on the fish which it is proposed to kill with them. A small club is used for *patuki* and other reef fish caught in reef angling or canoe fishing.

This club (C625) is shaped like a small tuki pounder with a blunt proximal end. It is 16 inches long, 2 inches in diameter at the distal end, 1 inch in diameter at the proximal end. The distal end is slightly convex. The club weighs 1¼ pounds. Larger clubs weighing up to 5 pounds are used for larger deep-sea fish. Today a section of iron bar is often used as a fish club.

Hook Containers

[415] When not in use, small, valuable single and composite pearl-shell hooks are kept in the house stored in the double satchel (*kaloveu pa*) described elsewhere (p. 134). Hooks and small fishing gear when taken into a canoe are kept for safety in a cocoanut-shell container (*puapu*).

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

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An example of this type of container (Chuuj) is a smoothly polished coconut shell, the eye end of which has been cut off to make a container 4 inches high, 3½ inches in diameter at the mouth. The mouth is covered with another half coconut shell (*puputi*), which fits tightly over the container.

Fishhook gorges used in fishing needle fish are kept when not in use by sticking them into a gorge cushion (*pepe ne*) which consists of a small cylindrical section of stripped coconut husk. The gorge cushion may itself be kept in the coconut container by the fisherman out in his canoe.

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FIGURE 35.—Fishing equipment. a, fish spear (*lao ika*) (Chuuj): 1, shaft of *pouipou* wood 10 feet 3 inches long, diameter at proximal end (enclosed) ¾ inch, widest diameter of butt 1½ inches; 2, 3, barb (*matangiki*) of *ngangia* wood, 1 foot 9 inches long, ½ inch diameter; 4, point (*mata*) of barb 2 inches long, cut in ½ inch; sharpened stem of barb forced (5) into pithy core of *pouipou* wood for 3 or more inches and held tight with 73 turns of two-ply twisted sennit (4); commencing and finishing ends buried; at point (5), observable projection above binding of butt. Second fish spear, constructed in field, was one-piece point and butt of *ngangia* wood, 8 feet long; barb 6½ inches long; proximal end finished with small terminal knob. b, gorge of pandanus spine (*matatuki*) (Chuuj): 1, 2, two spines (thorns) stripped from pandanus leaf and placed together so that barbs project on either side; spines joined together by sennit (3) of finest sort fiber with two pairs of half hitches (4, 5); 6, free end of sennit serves as bait tying string (*tukuke ennen*); length of gorge ½ inch, width ¼ inch.

Fish Spears

Most fish spears in use today are thin iron rods or wooden shafts with iron points. Formerly both shaft and barbed point were of wood. A typical spear is shown in figure 35,*a*.

Gorges

Two types of gorge (*au*) are in common use: one of fishbone is used for catching the needle fish; the other, of pandanus spine, is used for the flat-type fish.

The fishbone gorge is a bone of the later fish about 1 inch long. The strand of fine two-ply twisted sennit (*tukuke*) is fastened to the bone below the head by four half hitches (see picture). The free end of the strand serves as a bait string (*tukuke ennen*).

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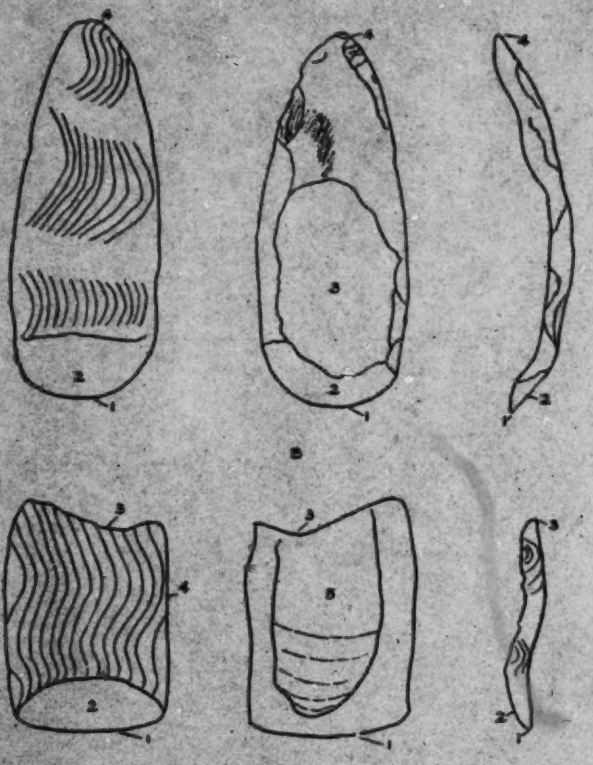

FIGURE 13.—Adzes of *Tridacna* shell. *a*, back, front, and side views (adz no. C 6527, Bernice P. Bishop Museum): 1, cutting edge; 2, bevel; 3, concavity of surface; 4, poll; greatest length, 4.75 inches. *b*, back, front and side views (adz in possession of R. D. Frisbie, Tahiti): 1, cutting edge; 2, ground bevel; 3, poll; 4, straight side; 5, central depression from natural concavity of shell; greatest length, 3 inches.

UTENSILS

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285 A small satchel of lauhala collected at Pukapuka has the following features.

Rectangular-sided and measuring 10 inches long, 8 inches high, and 1.5 inches wide, the satchel is made in simple check pattern. The bottom is flat and has square corners made by turning the strips as they are plaited. Each side is ornamented with strips of hala dyed red with native dyes. These strips are inserted over and included with the plaited elements. The pattern is X-shaped and is 7 inches long. On one side of the basket a solid square of the dyed hala is made between the forks formed by each arm of the X. The reverse side has two squares in each fork. The plaiting is commenced and

2;Macgregor E-2 (1933) 1935 Pukapukans

finished at the edge of the basket and is seamless. The end elements of the finishing edge are turned over and worked into the plaiting over the opposite elements. The basket has two handles made of braided strips of hala which are sewed to the sides.

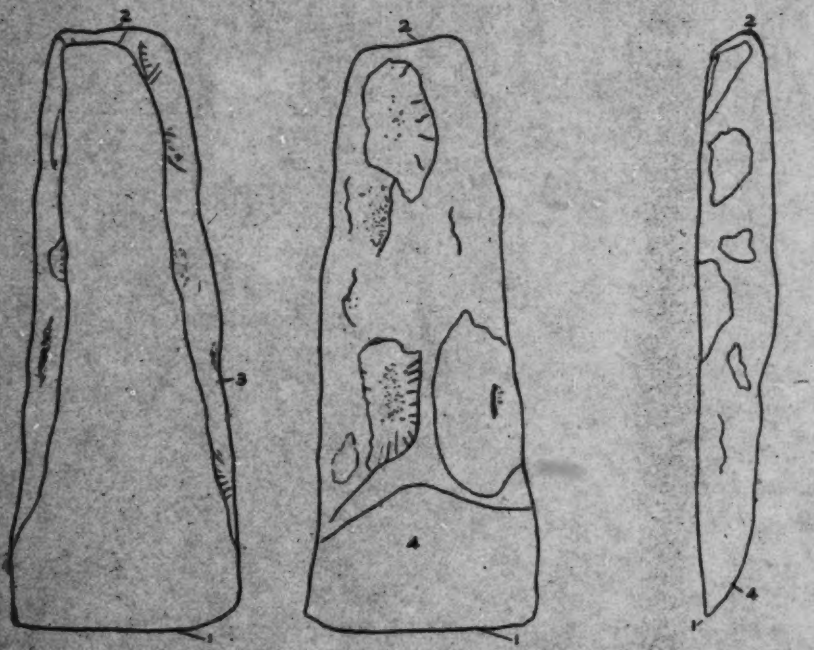

FIGURE 14.—Quadrilateral adz of basalt (no. B 8809, Bernice P. Bishop Museum), front, back, and side views: 1, cutting edge; 2, poll; 3, oblique side; 4, bevel; greatest length 7.5 inches.

Food is mixed in wooden bowls (*kumete*) (fig. 15). They are hewn from single pieces of wood and shaped into elliptical bowls with flat bottoms. Short handles are cut at either end.

FIGURE 15.—Elliptical wooden food bowl with end lug handles and flat bottom.